REMARKS

This Amendment is submitted in response to the Office Action dated September 30, 2005. In the Office Action, the Patent Office objected to the drawings under 37 CFR §1.83(a) for failing to show every feature of the invention specified in the claims. Further, the Patent Office rejected Claims 18-20 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 3,787,703 to *Topol;* rejected Claims 1, 2, 4, 5, 7, 9, 11, 12 and 14-20 under 35 U.S.C. §102(b) as being anticipated by U.S. Statutory Registration No. H277 to *Lee et al.;* rejected Claims 1-7, 9, 11-13 and 18-20 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 3,703,682 to *Wickman et al.;* rejected Claim 18-20 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,291,031 to *MacDonald et al.;* and rejected Claims 18 and 19 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,164,605 to *Kidwell*.

Moreover, the Patent Office rejected Claims 9-11, 14, 15 and 18-20 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,730,927 to *Smith et al.;* rejected Claims 1, 2, 4, 5, 7, 9-12, 14-16 and 18-20 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,484,620 to *Arshad et al.;* and rejected Claims 1 and 8 under 35 U.S.C. §103(a) as being unpatentable over *MacDonald et al.* in view of *Lee et al.*

By the present Amendment, Applicant amended Claims 1, 2, 9, 10, 18 and 19, canceled Claim 8 and added new Claim 21. Applicant

asserts that the amendments to the claims and the remarks that follow overcome the objection and the rejections made by the Patent Office and place the application in condition for allowance. Notice to that effect is requested.

In the Office Action, the Patent Office objected to the drawings under 37 CFR §1.83(a) for failing to show every feature of the invention specified in the claims. Namely, the Patent Office asserts that the drawings fail to show the magnetic embodiment having a shaft. In response to the objection, Applicant canceled Claim 8. Applicant submits that the cancellation of Claim 8 overcomes the objection by the Patent Office. Notice to that effect is requested.

In the Office Action, the Patent Office objected to the title of the invention as being not descriptive. More specifically, the Patent Office required a new title of the invention which is clearly indicative of the invention to which the claims are directed. In response to the objection, Applicant amended the title of the invention to read as follows: "APPARATUS, SYSTEM AND METHOD FOR DETERMINING A POSITION WITHIN A CYLINDER". Applicant submits that the amendment to the title of the invention overcomes the objection by the Patent Office. Notice to that effect is requested.

In the Office Action, the Patent Office rejected Claims 18-20 under 35 U.S.C. §102(b) as being anticipated by *Topol*. More specifically, the Patent Office alleges that:

> Regarding Claims 18-20, *Topol* discloses (see Fig. 4) a method for measuring a position of a shaft (35) within a cylinder (14) having walls defining an interior wherein the cylinder has an aperature (at 49) within one of the walls and further wherein the cylinder has a shaft (35) within the interior wherein the shaft is movable, comprising the steps of: directing light (from 45) into the cylinder through the aperture (49); (with 47) the light which enters the cylinder through the aperture; and relating an amount of light detected to the position of the shaft. *Topol* also discloses (see Fig. 5) placing a fluid within the cylinder.

Independent Claim 18, as amended, requires a method having the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder. Moreover, Claim 18 requires the step of determining a position of the head in the interior of the cylinder wherein the position of the head corresponds to the amount of light detected by the light sensor.

Topol merely discloses an apparatus which includes a glass tube surrounded by an opaque cylindrical body having compartments to hold a light source and two photocells. The body which holds the photocells and the light source has openings which permit light from the source to illuminate the interior of the tube and which permits the photocells to sense light coming from within the tube.

Nowhere does *Topol* teach or suggest a step of attaching a light sensor to the interior surface of the cylinder wherein the

light sensor extends inward with respect to the interior of the cylinder as required by Claim 18. Further, nowhere does *Topol* teach or suggest the step of determining a position of the head in the interior of the cylinder wherein the position of the head corresponds to the amount of light detected by the light sensor as required by Claim 18.

Topol merely discloses "the body 14 is provided with light communicating wall portions adjacent each of the light transmitting and receiving elements, an opening 49 being provided adjacent light source 45 and openings 50 and 51 being provided adjacent photocells 46 and 47, respectively." Further, *Topol* discloses "photocell 47 receives light resulting from scattering due to suspended particles, direct light being blocked by pin 40 which is schematically indicated in FIG. 6."

Under 35 U.S.C. §102(b), anticipation requires that a single reference discloses each and every element of Applicant's claimed invention. *Akzo N.V. v. U.S. International Trade Commission,* 808 F.2d 1471, 1479, 1 USPQ 2d. 1241, 1245 (Fed. Cir. 1986). Moreover, anticipation is not shown even if the differences between the claims and the reference are "insubstantial", and one skilled in the art could supply the missing elements. *Structure Rubber Products Co. v. Park Rubber Co.*, 749 F.2d. 707, 716, 223 USPQ 1264, 1270 (Fed. Cir. 1984).

Since *Topol* fails to disclose the steps specifically defined in amended independent Claim 18, Applicant asserts that the rejection of Claims 18-20 under 35 U.S.C. §102(b) has been overcome and should be withdrawn. Notice to that effect is requested.

In the Office Action, the Patent Office rejected Claims 1, 2, 4, 5, 7, 9, 11, 12 and 14-20 under 35 U.S.C. §102(b) as being anticipated by *Lee et al.* More specifically, the Patent Office alleges that:

> Regarding Claims 1, 2, 4, 5, 7, *Lee et al.* disclose (see Fig. 1) an apparatus for monitoring position, comprising: (12) having walls defining an interior and having a length defined between a first end and a second end; a wall at the first end; a shaft (16) having a length defined between the first and second end wherein a portion of the shaft is within the cylinder and the shaft moves within the cylinder; a head (32) connected to the shaft; an aperture (where fiber pierces into the interior 14) within the wall at the first end wherein light projects through the aperture into the cylinder; and a sensor (see Fig. 4) wherein the sensor detects intensity of light within the cylinder that corresponds to position of the shaft. The light source (within 22) is adjacent the first end as claimed. Furthermore, the wall encloses the cylinder as claimed. Further, since air (a gas) is present in the cylinder.
>
> Regarding Claims 9, 11, 12 and 14-17, *Lee et al.* discloses (see Fig. 1) a system for monitoring position, comprising: a cylinder (12) having walls defining an interior (14) and having a shaft (16) within the interior wherein the shaft extends through a wall of the cylinder, the shaft is movable withing the cylinder and further wherein the cylinder has a aperture (where fiber pierces into interior 14) in the wall adjacent to the shaft; and a sensor (within 22) within the cylinder wherein the sensor detects light within the cylinder and wherein an amount of light detected by the sensor corresponds to a position of the shaft withing the cylinder. *Lee et al.* also disclose (see Fig. 2) a coating on the shaft wherein the coating absorbs light (differing/low reflectivity). Further, since air (a gas) is present in the cylinder, a fluid is within the cylinder as claimed. The fiber serves as a window as claimed.

> Regarding claims 18-20, *Lee et al.* disclose (see Fig. 1) a method for measuring a position of a shaft (16) within a cylinder (12) having walls defining an interior (14) wherein the cylinder has an aperture (at where fibers pierce the interior 14) within one of the walls and further wherein the cylinder has a shaft (16) within the interior wherein the shaft is movable, comprising the steps of: (see Fig. 4) directing light into the cylinder through the aperture; detecting the light which enters the cylinder through the aperture; and relating an amount of light detected to the position of the shaft. Further, since air (a gas) is present in the cylinder, a fluid is within the cylinder as claimed.

Independent Claim 1, as amended, requires an apparatus having an aperture within the first wall at the first end wherein light projects through the aperture into the cylinder and a sensor within the second wall of the cylinder. Further, Claim 1 requires that the sensor detects intensity of light within the interior of the cylinder which is not absorbed by the shaft and the interior of the cylinder wherein the intensity of light detected by the sensor corresponds to a position of the shaft in the interior of the cylinder.

Independent Claim 9, as amended, requires a system having a sensor within the interior of the cylinder wherein the sensor extends inward with respect to the interior of the cylinder wherein the sensor detects an amount of light within the cylinder which is not absorbed by the shaft and further wherein the amount of light detected by the sensor corresponds to a position of the shaft within the interior of the cylinder.

Independent Claim 18, as amended, requires a method having the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder. Moreover, Claim 18 requires the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light.

Lee et al. merely disclose an apparatus for measuring the direction, extent and rate of linear displacet of a body (e.g. a steel bulkhead) subjected to a harsh environment such as shock from an explosive force. Moreover, *Lee et al.* disclose a housing containing an extendable piston is connected between the movable body and a fixed structure.

Nowhere do *Lee et al.* teach or suggest an aperture within the first wall at the first end wherein light projects through the aperture into the cylinder and a sensor within the second wall of the cylinder as required by Claim 1. Further, nowhere do *Lee et al.* teach or suggest that the sensor detects intensity of light within the interior of the cylinder which is not absorbed by the shaft and the interior of the cylinder wherein the intensity of light detected by the sensor corresponds to a position of the shaft in the interior of the cylinder as required by Claim 1. Nowhere do *Lee et al.* teach or suggest a sensor within the interior of the cylinder wherein the sensor extends inward with respect to the

interior of the cylinder wherein the sensor detects an amount of light within the cylinder which is not absorbed by the shaft and further wherein the amount of light detected by the sensor corresponds to a position of the shaft within the interior of the cylinder as required by Claim 9. Further, nowhere do *Lee et al.* teach or suggest the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder as required by Claim 18. Moreover, nowhere do *Lee et al.* teach or suggest the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light as required by Claim 18.

On the contrary, *Lee et al.* merely disclose that the piston has a surface marked with alternating high and low light reflecting bands which pass under a pair of light emitting optical fibers fixed on the housing. Further, *Lee et al.* disclose that light reflected from the bands is detected and converted into corresponding out of phase electrical signals for measuring direction, extent and rate of linear displacement of the piston. Still further, *Lee et al.* disclose that optical fibers 24 and 26 extend from inside block 22, through cavity portion 20, and terminate in fixed positions in housing 12 in optical communication with banded surface 28 on piston 16. Moreover, *Lee et al.* disclose

that banded portion 28 of the piston translate past the light emitting ends of spaced apart optical fibers 24 and 26. Furthermore, *Lee et al.* disclose that the magnitude of light returned (reflected) into fiber 42 and coupled into optical fiber 40 depends upon the reflectivity of groove 29'.

Under 35 U.S.C. §102(b), anticipation requires that a single reference discloses each and every element of Applicant's claimed invention. *Akzo N.V. v. U.S. International Trade Commission,* 808 F.2d 1471, 1479, 1 USPQ 2d. 1241, 1245 (Fed. Cir. 1986). Moreover, anticipation is not shown even if the differences between the claims and the reference are "insubstantial", and one skilled in the art could supply the missing elements. *Structure Rubber Products Co. v. Park Rubber Co.*, 749 F.2d. 707, 716, 223 USPQ 1264, 1270 (Fed. Cir. 1984).

Since *Lee et al.* fail to disclose the elements and steps specifically defined in amended independent Claims 1, 9 and 18, respectively, Applicant asserts that the rejection of Claims 1, 2, 4, 5, 7, 9, 11, 12 and 14-20 under 35 U.S.C. §102(b) has been overcome and should be withdrawn. Notice to that effect is requested.

In the Office Action, the Patent Office rejected Claims 1-7, 9, 11-13 and 18-20 under 35 U.S.C. §102(b) as being anticipated by *Wickman et al.* More specifically, the Patent Office alleges that:

> Regarding claims 1-6, 7, 9, 11-13 and 18-20, *Wickman et al.* disclose (see Fig. 2) an apparatus for monitoring position, comprising: a cylinder (11, 49) having walls defining an interior and having a length

> defined between a first end and a second end; a wall at the first end; a shaft (41) having length defined between the first and second end wherein a portion of the shaft is within the cylinder and the shaft moves within the cylinder; a head (47) connected to the shaft; an aperture (15; see fig. 1) within the wall at the first end wherein light projects through the aperture into the cylinder; and a sensor detects intensity of light within the cylinder that corresponds to a position of the shaft. The light source (at 21) is adjacent the first end and the aperture is at the center of the wall as claimed. Furthermore, the wall encloses the cylinder as claimed. Further, since air (a gas) is present in the cylinder, a fluid is within the cylinder as claimed. *Wickman et al.* also disclose (see Fig. 2) a second shaft (37) within the cylinder. The sensor is adjacent to the second end of the cylinder.

Independent Claim 1, as amended, requires an apparatus having an aperture within the first wall at the first end wherein light projects through the aperture into the cylinder and a sensor within the second wall of the cylinder. Further, Claim 1 requires that the sensor detects intensity of light within the interior of the cylinder which is not absorbed by the shaft and the interior of the cylinder wherein the intensity of light detected by the sensor corresponds to a position of the shaft in the interior of the cylinder.

Independent Claim 9, as amended, requires a system having a sensor within the interior of the cylinder wherein the sensor extends inward with respect to the interior of the cylinder wherein the sensor detects an amount of light within the cylinder which is not absorbed by the shaft and further wherein the amount of light detected by the sensor corresponds to a position of the shaft within the interior of the cylinder.

Independent Claim 18, as amended, requires a method having the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder. Moreover, Claim 18 requires the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light.

Wickman et al. merely disclose a gradiometer which has two magnetometers axially spaced apart by an internally non-reflecting tube. Moreover, Wickman et al. disclose that one magnetometer is attached to a light source fixed centrally of a photo multiplier array at one end of the tube.

Nowhere do *Wickman et al.* teach or suggest the sensor which detects intensity of light within the interior of the cylinder which is not absorbed by the shaft and the interior of the cylinder wherein the intensity of light detected by the sensor corresponds to a position of the shaft in the interior of the cylinder as required by Claim 1. Nowhere do *Wickman et al.* teach or suggest the sensor which detects an amount of light within the cylinder which is not absorbed by the shaft and further wherein the amount of light detected by the sensor corresponds to a position of the shaft within the interior of the cylinder as required by Claim 9. Nowhere do *Wickman et al.* teach or suggest the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder

wherein the light sensor detects the amount of light as required by Claim 18.

On the contrary, *Wickman et al.* merely disclose that the reflected light returns to the source if the magnetometers are coaxial when the magnetometer axes are not parallel. The reflected light is sensed by the photomultiplier array the outputs of which drive a servo to realign the gimbaled mirro/magnetometer arrangement to parallelism so that sensed earth's field components are eliminated during operational use of the magnetometers as a gradiometer. Further, *Wickman et al.* disclose the light beam 29 is initially reflected as beam 33 to a point 27a (FIG. 3) on array 27 causing X and Y axis component signal voltages to be generated.

Under 35 U.S.C. §102(b), anticipation requires that a single reference discloses each and every element of Applicant's claimed invention. *Akzo N.V. v. U.S. International Trade Commission,* 808 F.2d 1471, 1479, 1 USPQ 2d. 1241, 1245 (Fed. Cir. 1986). Moreover, anticipation is not shown even if the differences between the claims and the reference are "insubstantial", and one skilled in the art could supply the missing elements. *Structure Rubber Products Co. v. Park Rubber Co.*, 749 F.2d. 707, 716, 223 USPQ 1264, 1270 (Fed. Cir. 1984).

Since *Wickman et al.* fail to disclose the elements and steps specifically defined in amended independent Claims 1, 9 and 18, respectively, Applicant asserts that the rejection of Claims 1-7,

9, 11-13 and 18-20 under 35 U.S.C. §102(b) has been overcome and should be withdrawn. Notice to that effect is requested.

In the Office Action, the Patent Office rejected Claims 18-20 under 35 U.S.C. §102(b) as being anticipated by *MacDonald et al.* More specifically, the Patent Office alleges that:

> Regarding claims 18-20, *MacDonald et al.* disclose (see Fig. 1) a method for measuring a position of a shaft (9) within a cylinder (7) having walls (top and side) defining an interior wherein the cylinder has an aperture (at 3) within one of the walls (top) and further wherein the cylinder has a shaft (9) within the interior wherein the shaft is movable, comprising the steps of: directing light (from 1) into the cylinder through the aperture (3); detecting (with at least 19 and 20) the light which enters the cylinder through the aperture; and relating (with 11) an amount of light detected to the position of the shaft. Since are (a gas) is placed in a cylinder, there is a fluid in the cylinder as claimed.

Independent Claim 18, as amended, requires a method having the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder. Moreover, Claim 18 requires the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light.

MacDonald et al. merely disclose an apparatus and an electronic circuit for the measurement of fluid levels in containers. The electronic circuit and the apparatus constitute an instrument which measures fluid levels by optical means. Further, *MacDonald et al.* disclose that only light signals are used near the fluid itself to provide an intrinsically safe method of measuring

fluid levels in the presence of explosive or flammable fluids, vapours or gasses, or in containers which must be electrically isolated.

Nowhere do *MacDonald et al.* teach or suggest the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder as required by Claim 18. Further, nowhere do *MacDonald et al.* teach or suggest the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light as required by Claim 18.

On the contrary, *MacDonald et al.* merely disclose that measurement of the fluid level is made by determining the distance from the fitting 4 to the reflector 8 via an optical ranging technique. Further, *MacDonald et al.* disclose that the measurement is carried out at a remote location 12 by an electronic circuit 11 that generates the optical signal via remote light source I and processes the reflected signal returned from the fitting 4 via a second optical fitting 4 of container 5 only by light guides such as 2 and 13, which are characterized by very low electrical and thermal conductance. Still further, *MacDonald et al.* disclose that the receiver 15 comprises photoreceptors 19 and 23 such as a photodiodes for receiving the optical signals reflected by the reflector 8 and coupled to the photoreceptor 19 via lens 6 and

optical guide 13 (FIG. 1), and the optical signal coupled to the photoreceptor 23 from optical guide 22.

Under 35 U.S.C. §102(b), anticipation requires that a single reference discloses each and every element of Applicant's claimed invention. *Akzo N.V. v. U.S. International Trade Commission,* 808 F.2d 1471, 1479, 1 USPQ 2d. 1241, 1245 (Fed. Cir. 1986). Moreover, anticipation is not shown even if the differences between the claims and the reference are "insubstantial", and one skilled in the art could supply the missing elements. *Structure Rubber Products Co. v. Park Rubber Co.*, 749 F.2d. 707, 716, 223 USPQ 1264, 1270 (Fed. Cir. 1984).

Since *MacDonald et al.* fail to disclose the steps specifically defined in amended independent Claim 18, Applicant asserts that the rejection of Claims 18-20 under 35 U.S.C. §102(b) has been overcome and should be withdrawn. Notice to that effect is requested.

In the Office Action, the Patent Office rejected Claims 18 and 19 under 35 U.S.C. §102(b) as being anticipated by *Kidwell*. More specifically, the Patent Office alleges that:

> Regarding claims 18 and 19, *Kidwell* discloses (see Fig. 2b) a method for measuring a position of a shaft (24 or 40) within a cylinder (20) having walls defining an interior wherein the cylinder has an aperture (at where 34 enters cylinder) within one of the walls and further wherein the cylinder has a shaft (24 or 40) within the interior wherein the shaft is movable, comprising the steps of: directing light (from 30) into the cylinder through the aperture; detecting (with 32) the light which enters the cylinder through the aperture; and relating an amount of light detected to the position of the shaft.

Independent Claim 18, as amended, requires a method having the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder. Moreover, Claim 18 requires the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light.

Kidwell merely discloses a fiber optic microbend sensor which employs a resilient coil with an optical fiber. An optical signal is applied to the optical fiber with the coil (12) interrogating a parameter. Any movement of the coil modulates the optical signal transmitted along the optical fiber. Moreover, *Kidwell* discloses that detecting means measures the modulations of the optical signal for characterization of the parameter.

Nowhere does *Kidwell* teach or suggest the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder as required by Claim 18. Further, nowhere does *Kidwell* teach or suggest the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light as required by Claim 18.

On the contrary, *Kidwell* merely discloses that detecting means measure the modulation of the optical signal transmitted through the optical fiber for sensing the parameter. Further, *Kidwell*

discloses that the optical fiber (10) at one end (13) of the coil (12) is positioned facing reflecting means (14) such as a mirror or a reflective coating directly on the optical fiber (10). Still further, *Kidwell* discloses that the end of the optical fiber (18) is connected to a light splitting means (28) such as 3 db coupler where it is directed to a light source (30) and detecting means (32) with known optical splices (34, 36, 38).

Under 35 U.S.C. §102(b), anticipation requires that a single reference discloses each and every element of Applicant's claimed invention. *Akzo N.V. v. U.S. International Trade Commission,* 808 F.2d 1471, 1479, 1 USPQ 2d. 1241, 1245 (Fed. Cir. 1986). Moreover, anticipation is not shown even if the differences between the claims and the reference are "insubstantial", and one skilled in the art could supply the missing elements. *Structure Rubber Products Co. v. Park Rubber Co.*, 749 F.2d. 707, 716, 223 USPQ 1264, 1270 (Fed. Cir. 1984).

Since *Kidwell* fails to disclose the steps specifically defined in amended independent Claim 18, Applicant asserts that the rejection of Claims 18 and 19 under 35 U.S.C. §102(b) has been overcome and should be withdrawn. Notice to that effect is requested.

In the Office Action, the Patent Office rejected Claims 9-11, 14, 15 and 18-20 under 35 U.S.C. §102(e) as being anticipated by *Smith et al.* More specifically, the Patent Office alleges that:

> Regarding claims 9-11, 14, 15 and 18-20, *Smith et al.* disclose (see Figs. 1and 4) a system for monitoring position, comprising: a cylinder (12) having walls defining an interior and having a shaft (14) within the interior wherein the shaft extends through a wall of the cylinder, the shaft is movable within the cylinder and further wherein the cylinder has a aperture (at window 30; see Fig. 4) in the wall adjacent to the shaft; and a sensor (20; see Fig. 1) within the cylinder wherein the sensor detects light within the cylinder and wherein an amount of light detected by the sensor corresponds to a position of the shaft within the cylinder.

Independent Claim 9, as amended, requires a sensor within the interior of the cylinder wherein the sensor extends inward with respect to the interior of the cylinder. Moreover, Claim 9 requires the sensor which detects an amount of light within the cylinder which is not absorbed by the shaft and further wherein the amount of light detected by the sensor corresponds to a position of the shaft within the interior of the cylinder.

Independent Claim 18, as amended, requires a method having the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder. Moreover, Claim 18 requires the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light.

Smith et al. merely disclose devices for the measurement of volumetric flow rate of a gas in a conduit having a vane arrangement which is subjected to airflow and which is displaced. The vane arrangement forms a light guide, and one end of the vane

arrangement receives an encoded light source, the encoding being over the range of displacement of the vane. Moreover, *Smith et al.* disclose that the encoding can be achieved by a light source and a mask which is shaped to provide for variance of the light transmitted as a function of the vane displacement range.

Nowhere do *Smith et al.* teach or suggest a sensor within the interior of the cylinder wherein the sensor extends inward with respect to the interior of the cylinder as required by Claim 9. Further, nowhere do *Smith et al.* teach or suggest the sensor which detects an amount of light within the cylinder which is not absorbed by the shaft and further wherein the amount of light detected by the sensor corresponds to a position of the shaft within the interior of the cylinder as required by Claim 9. Nowhere do *Smith et al.* teach or suggest the step of attaching a light sensor to the interior surface of the cylinder wherein the light sensor extends inward with respect to the interior of the cylinder as required by Claim 18. Moreover, nowhere do *Smith et al.* teach or suggest the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light as required by Claim 18.

On the contrary, *Smith et al.* merely disclose that a flow sensor 10 is arranged inside a conduit 12 associated with a CPAP apparatus, ventilatory assist device which provides a path for breathable gas to flow. Further, *Smith et al.* disclose "when light

from a uniform light source 16 reaches the arcuate portion 13, subject to the influence of an encoder, in the form of a mask 24 located on the arcuate portion 13, the polished end surface 8 of the free end 18 receives and transmits light in a lengthwise direction 15 through the length of the vane 14." Moreover, *Smith et al.* disclose that the light detector 20 provides an electrical output signal at the pins 23 according to an intensity of light received on the detection face 22 which has travelled in direction 15.

Under 35 U.S.C. §102(b), anticipation requires that a single reference discloses each and every element of Applicant's claimed invention. *Akzo N.V. v. U.S. International Trade Commission,* 808 F.2d 1471, 1479, 1 USPQ 2d. 1241, 1245 (Fed. Cir. 1986). Moreover, anticipation is not shown even if the differences between the claims and the reference are "insubstantial", and one skilled in the art could supply the missing elements. *Structure Rubber Products Co. v. Park Rubber Co.*, 749 F.2d. 707, 716, 223 USPQ 1264, 1270 (Fed. Cir. 1984).

Since *Smith et al.* fail to disclose the elements and the steps specifically defined in amended independent Claims 9 and 18, respectively, Applicant asserts that the rejection of Claims 9-11, 14, 15 and 18-20 under 35 U.S.C. §102(e) has been overcome and should be withdrawn. Notice to that effect is requested.

In the Office Action, the Patent Office rejected Claims 1, 2, 4, 5, 7, 9-12, 14-16 and 18-20 under 35 U.S.C. §102(e) as being

anticipated by *Arshad et al.* More specifically, the Patent Office alleges that:

> Regarding claims 1, 2, 4, 5, 7, 9-12 and 14-16, *Arshad et al.* disclose (see Fig. 1) an apparatus for monitoring position, comprising: a cylinder (12) having walls defining an interior and having a length defined between the first end and a second end; a wall at the first end; a shaft (24) having a length defined between a first and second end wherein a portion of the shaft is within the cylinder and the shaft moves within the cylinder; a head (22) connected to the shaft; an aperture (at window 46) within the wall at the first end wherein light projects through the aperture into the cylinder; and a sensor (48, 40) within the cylinder wherein the sensor detects intensity of a light within the cylinder that corresponds to a position of the shaft. The light source (36) is adjacent the first end and the aperture is at the center of the wall as claimed. Furthermore, the wall encloses the cylinder as claimed. Further, since air (a gas) is present in the cylinder, a fluid is within the cylinder as claimed. *Arshad et al.* disclose (see Fig. 2) a second shaft (37) within the cylinder. The sensor is adjacent to the second end of the cylinder. *Arshad et al.* also disclose a head (22) attached to the shaft and a processor (39) connected to the sensor. *Arshad et al.* also disclose (see Fig. 2) placing a fluid (with 30) within the cylinder.
>
> Regarding claims 18-20, *Arshad et al.* disclose (see Fig. 2) a method for measuring a position of a shaft (24) within a cylinder (12) having walls defining an interior wherein the cylinder has an aperture (at 46) within one of the walls and further wherein the cylinder has a shaft (24) within the interior wherein the shaft is movable, comprising the steps of: directing light (from 36) into the cylinder through the aperture; detecting (with 40) the light which enters the cylinder through the aperture; and relating an amount of light detected to the position of the shaft. *Arshad et al.* also disclose (see Fig. 2) placing a fluid (with the cylinder).

Independent Claim 1, as amended, requires an aperture within the first wall at the first end wherein light projects through the aperture into the cylinder and a sensor within the second wall of the cylinder wherein the sensor detects intensity of light within

the interior of the cylinder which is not absorbed by the shaft and the interior of the cylinder.

Independent Claim 9, as amended, requires the sensor which detects an amount of light within the cylinder which is not absorbed by the shaft and further wherein the amount of light detected by the sensor corresponds to a position of the shaft within the interior of the cylinder.

Independent Claim 18, as amended, requires the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light.

Arshad et al. merely disclose a hydraulic actuator having a cylinder with a piston that is moved by hydraulic fluid. A light guide in one end of the cylinder directs a laser beam into the cylinder, and off the piston where the beam is reflected. The beam then exits the cylinder through a second light guide. Moreover, *Arshad et al.* disclose a control unit which measures the time of flight of the laser beam and calculates the piston position.

Nowhere do *Arshad et al.* teach or suggest an aperture within the first wall at the first end wherein light projects through the aperture into the cylinder and a sensor within the second wall of the cylinder wherein the sensor detects intensity of light within the interior of the cylinder which is not absorbed by the shaft and the interior of the cylinder as required by Claim 1. Nowhere do *Arshad et al.* teach or suggest the sensor which detects an amount

of light within the cylinder which is not absorbed by the shaft and further wherein the amount of light detected by the sensor corresponds to a position of the shaft within the interior of the cylinder as required by Claim 9. Nowhere do *Arshad et al.* teach or suggest the step of detecting an amount of the light in the interior of the cylinder which is not absorbed by the interior surface and the head of the cylinder wherein the light sensor detects the amount of light as required by Claim 18.

On the contrary, *Arshad et al.* merely disclose that a reflective surface 26 is fixed to piston 22 and is configured to reflect laser light that is introduced into the cylinder. Further, *Arshad et al.* disclose that the light impinges upon reflective surface portion 26, bounces back to reflective surface 51, returns to reflective surface portion 27 on the piston and bounces off that surface to ultimately impinge upon the one or more photo diodes that make up photo diode array 40. Moreover, *Arshad et al.* disclose that laser beam 44 can travel down input fiber optic cable 37', through coupler 46, bounce off reflective surface 26 (FIG. 1) and return to optical coupler 48, either directly or with an intermediate reflection off end cap 18, thence through output fiber optic cable 41', to photo diodes 42.

Under 35 U.S.C. §102(b), anticipation requires that a single reference discloses each and every element of Applicant's claimed invention. *Akzo N.V. v. U.S. International Trade Commission,* 808 F.2d 1471, 1479, 1 USPQ 2d. 1241, 1245 (Fed. Cir. 1986). Moreover,

anticipation is not shown even if the differences between the claims and the reference are "insubstantial", and one skilled in the art could supply the missing elements. *Structure Rubber Products Co. v. Park Rubber Co.*, 749 F.2d. 707, 716, 223 USPQ 1264, 1270 (Fed. Cir. 1984).

Since *Arshad et al.* fail to disclose the elements and the steps specifically defined in amended independent Claims 1, 9 and 18, respectively, Applicant asserts that the rejection of Claims 9-11, 14, 15 and 18-20 under 35 U.S.C. §102(e) has been overcome and should be withdrawn. Notice to that effect is requested.

In the Office Action, the Patent Office rejected Claims 1 and 8 under 35 U.S.C. §103(a) as being unpatentable over *MacDonald et al.* in view of *Lee et al.* More specifically, the Patent Office asserts that:

> Regarding claims 1 and 8, *MacDonald et al.* disclose (see Figs.) the claimed invention as set forth above. *MacDonald et al.* also disclose a magnet (9) adjacent to the cylinder effecting movement of the head (8). *MacDonald et al.* do not specifically disclose the sensor within the cylinder. *Lee et al.* teach (see Figs) providing a sensor (within 22) within the cylinder.

Independent Claim 1, as amended, requires an aperture within the first wall at the first end wherein light projects through the aperture into the cylinder and a sensor within the second wall of the cylinder. Moreover, Claim 1 requires the sensor detects intensity of light within the interior of the cylinder which is not absorbed by the shaft and the interior of the cylinder.

Neither *MacDonald et al.* nor *Lee et al.*, taken singly or in combination, teaches or suggests an aperture within the first wall at the first end wherein light projects through the aperture into the cylinder and a sensor within the second wall of the cylinder as required by Claim 1. Further, neither *MacDonald et al.* nor *Lee et al.*, taken singly or in combination, teaches or suggests that the sensor detects intensity of light within the interior of the cylinder which is not absorbed by the shaft and the interior of the cylinder as required by Claim 1.

On the contrary, *MacDonald et al.* merely disclose that the measurement is carried out at a remote location 12 by an electronic circuit 11 that generates the optical signal via remote light source I and processes the reflected signal returned from the fitting 4 via a second optical fitting 4 of container 5 only by light guides such as 2 and 13, which are characterized by very low electrical and thermal conductance. Further, *MacDonald et al.* disclose that the receiver 15 comprises photoreceptors 19 and 23 such as a photodiodes for receiving the optical signals reflected by the reflector 8 and coupled to the photoreceptor 19 via lens 6 and optical guide 13 (FIG. 1), and the optical signal coupled to the photoreceptor 23 from optical guide 22. *Lee et al.* merely disclose that optical fibers 24 and 26 extend from inside block 22, through cavity portion 20, and terminate in fixed positions in housing 12 in optical communication with banded surface 28 on piston 16. Moreover, *Lee et al.* disclose that light reflected from

the bands is detected and converted into corresponding out of phase electrical signals for measuring direction, extent and rate of linear displacement of the piston.

Further, Applicant asserts that one of ordinary skill in the art at the time of Applicant's invention would never have been motivated to combine *MacDonald et al.* and *Lee et al.* in the manner suggested by the Patent Office in formulating the rejections under 35 U.S.C. §103(a). It is submitted that the question under §103 is whether the totality of the art would collectively suggest the claimed invention to one of ordinary skill in this art. In re Simon, 461 F.2d 1387, 174 USPQ 114 (CCPA 1972).

That elements, even distinguishing elements, are disclosed in the art is alone insufficient. It is common to find elements somewhere in the art. Moreover, most if not all elements perform their ordained and expected functions. The test is whether the invention as a whole, in light of the teachings of the references in their entireties, would have been obvious to one of ordinary skill in the art at the time the invention was made. Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983).

It is insufficient that the art disclosed components of Applicant's invention, either separately or used in other combinations. A teaching, suggestion, or incentive must exist to make the combination made by Applicant. Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1988).

With the analysis of the deficiencies of the *MacDonald et al.* and *Lee et al.* in mind, as enumerated above, no reason or suggestion in the evidence of record exists why one of ordinary skill in the art would have been led to modify *MacDonald et al.* with *Lee et al.* to produce the claimed invention. Therefore, *prima facie* obviousness has not been established by the Patent Office as required under 35 U.S.C. §103.

Even assuming that one having ordinary skill in the art could somehow have combined the references applied by the Patent Office, the references still lack the structural elements positively recited in Claim 1. Namely, neither *MacDonald et al.* nor *Lee et al.*, taken singly or in combination, teaches or suggests an aperture within the first wall at the first end wherein light projects through the aperture into the cylinder and a sensor within the second wall of the cylinder as required by Claim 1. Further, neither *MacDonald et al.* nor *Lee et al.*, taken singly or in combination, teaches or suggests the sensor detects intensity of light within the interior of the cylinder which is not absorbed by the shaft and the interior of the cylinder as required by Claim 1.

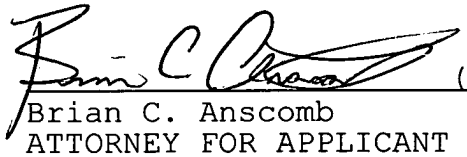
In view of the foregoing remarks and amendments, Applicant respectfully submits that the rejection of Claims 1 and 8 under 35 U.S.C. §103(a) has been overcome and should be withdrawn. Notice to that effect is requested.

Claims 2-7 depend from Claim 1; Claims 10-17 depend from Claim 9; and Claim 19-21 depend from Claim 18. These claims are further

believed allowable over the references of record since each sets forth additional structural elements and novel steps of Applicant's apparatus, system and method, respectively.

In view of the foregoing remarks and arguments, Applicant respectfully submits that all of the claims in the application are in allowable form and that the application is in condition for allowance. If, however, any outstanding issues remain, Applicant urges the Patent Office to telephone Applicant's attorney so that the same may be resolved and the application expedited to issue. Applicant requests the Patent Office to indicate all claims as allowable and to pass the application to issue.

Respectfully submitted,

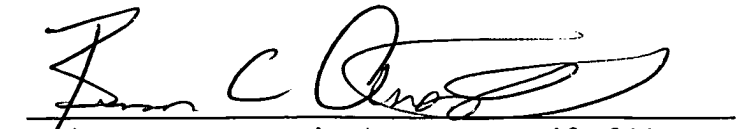


(Reg. No. 48,641)

Brian C. Anscomb
ATTORNEY FOR APPLICANT
Patents+TMS
A Professional Corporation
2849 W. Armitage Ave.
Chicago, Illinois 60647
Telephone: (773) 772-6009

CERTIFICATE OF MAILING

I hereby certify that this **Amendment** and **Return Receipt Postcard** are being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on December 28, 2005.



Brian C. Anscomb (Reg. No. 48,641)